

That which is claimed is:

1. A composition for fuel or blending component of fuels which are liquid at ambient conditions, which composition comprises: as a predominant component organic distillates, which  
5 predominant component exhibits a suitable initial boiling point and contains less than 15 ppm sulfur; and one or more oxygen-containing organic compounds in amounts such that the oxygen content of the fuel is in a range from about 0.2 percent to about 20 percent oxygen.
- 10 2. The composition according to claim 1 wherein the amounts of the oxygen-containing organic compounds are such that
- $$[10^{\circ} \text{ C.} + (\text{IBP})_{\text{composition}}] > (\text{IBP})_{\text{distillates}},$$
- where  $(\text{IBP})_{\text{composition}}$  is the initial boiling point of the composition and  $(\text{IBP})_{\text{distillates}}$ , is the initial boiling point of the distillates.
- 15 3. The composition according to claim 1 wherein the predominant component is a mixture of organic compounds derived from natural petroleum.
4. The composition according to claim 1 wherein the predominant component comprises alkanes containing from 5 to  
20 about 15 carbon atoms of which at least about 85 percent are normal alkanes.
5. The composition according to claim 1 further comprising an effective amount of one or more fuel additives which enhance desired fuel properties.
- 25 6. A fuel for use in compression ignition internal combustion engines, comprising: as a predominant component organic distillates, and one or more oxygen-containing organic compounds in amounts such that the oxygen content of the fuel is in a range from about 0.2 percent to about 10 percent oxygen, and  
30 wherein the fuel exhibits a suitable flash point of at least  $38^{\circ} \text{ C.}$  as measure by ASTM D93, and contains less than 15 ppm sulfur.

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7. The composition according to claim 6 wherein the fuel exhibits a suitable flash point of at least 49° C.

8. The composition according to claim 6 further comprising an effective amount of one or more Diesel fuel additives selected from the group consisting of copolymers of ethylene and vinyl acetate, which enhances cold flow properties of Diesel fuel.

9. A fuel for use in spark ignition internal combustion engines, comprising: as a predominant component organic distillates, and one or more oxygen-containing organic compounds in amounts such that the oxygen content of the fuel is in a range from about 0.2 percent to about 10 percent oxygen, and wherein the fuel exhibits a suitable Reid vapor pressure of at least 6 psi and contains less than 15 ppm sulfur.

10. A composition for fuel or blending component for fuels which are liquid at ambient conditions, which composition comprises: as a predominant component organic distillates which contain less than 15 ppm sulfur, and oxygen-containing organic compounds derived from natural petroleum in amounts such that the oxygen content of the fuel is in a range from about 0.2 percent to about 10 percent oxygen, with the proviso that at least 10 percent of the oxygen is contained in cyclic benzylic ketones.

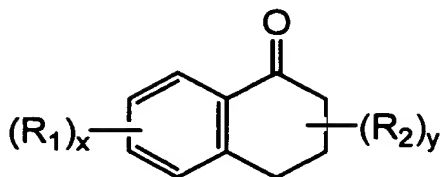
11. The composition according to claim 10 wherein at least 5 percent of the oxygen is contained in cyclic benzylic diketones.

12. The composition according to claim 10 further comprising an effective amount of one or more fuel additives which enhance desired fuel properties.

13. A composition for fuel or blending component for fuels, which are liquid at ambient conditions, which composition comprises: as a predominant component petroleum distillates which contain less than 15 ppm sulfur, and oxygen-containing organic compounds derived from natural petroleum in amounts such that the oxygen content of the fuel is in a range from about 0.2 percent to about 10 percent oxygen, with the proviso that at least 10

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percent of the oxygen is contained in aryl oxygenates represented by

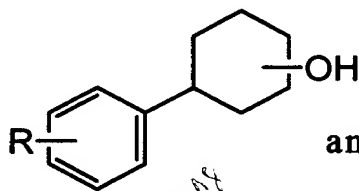


*cetane H<sub>2</sub> +15.1*

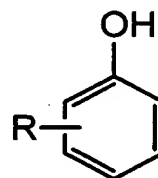
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where R<sub>1</sub> are independently selected from the group consisting of hydrogen and hydrocarbon radicals containing from 1 to about 10 carbon atoms, x is an integer from 1 to 4; R<sub>2</sub> are independently selected from the group consisting of hydrogen, hydroxyl, carbonyl oxygen and organic moieties containing from 1 to about 10 carbon atoms, and y is an integer from 1 to 3.

14. The composition according to claim 13 wherein at least 10 percent of the oxygen is contained in aryl oxygenates represented by



and



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where R<sub>1</sub> is hydrogen or a hydrocarbon radical containing from 1 to about 10 carbon atoms.

15. A composition for fuel or blending component of fuels which are liquid at ambient conditions, the composition formed by a process which comprises:

partitioning by distillation an organic feedstock comprising a mixture of organic compounds derived from natural petroleum, the mixture having a gravity ranging from about 10° API to about 75° API to provide at least one low-boiling organic part consisting of a sulfur-lean, mono-aromatic-rich fraction, and a high-boiling organic part consisting of a sulfur-rich, mono-aromatic-lean fraction;

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contacting a gaseous source of dioxygen with at least a portion of the low-boiling organic part in a liquid reaction medium containing a soluble catalyst system comprising a source of at least one catalyst metal selected from the group consisting of manganese, cobalt, nickel, chromium, vanadium, molybdenum, tungsten, tin, cerium, or mixture thereof, while maintaining the liquid reaction medium substantially free of halogen and/or halogen-containing compounds, to form a mixture of immiscible phases comprising hydrocarbons, oxygenated organic compounds, water of reaction, and acidic co-products;

separating from the mixture of immiscible phases at least a first organic liquid of low density comprising hydrocarbons, oxygenated organic compounds and acidic co-products and second liquid of high density which contains at least portions of the catalyst metal, water of reaction and acidic co-products; and

contacting all or a portion of the separated organic liquid with a neutralizing agent thereby recovering a low-boiling oxygenated product having a low content of acidic co-products.

16. The composition according to claim 15 wherein at least a portion of the separated organic liquid is contacted with an aqueous solution of a chemical base, and the recovered oxygenated product exhibits a total acid number of less than about 20 mg KOH/g.

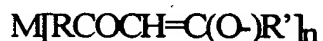
17. The composition according to claim 16 wherein the chemical base is a compound selected from the group consisting of sodium, potassium, barium, calcium and magnesium in the form of hydroxide, carbonate or bicarbonate.

18. The composition according to claim 15 wherein all or at least a portion of the organic feedstock is a product of a hydrotreating process for petroleum distillates consisting essentially of material boiling between about 50° C. and about 425° C. which hydrotreating process includes reacting the petroleum distillate with a source of hydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst to assist by hydrogenation

removal of sulfur and/or nitrogen from the hydrotreated petroleum distillate.

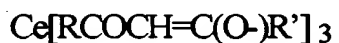
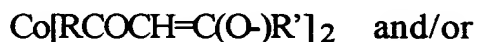
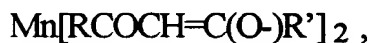
19. The composition according to claim 15 wherein the catalyst system comprises a source of catalyst metal selected from the group consisting of manganese, cobalt, nickel, chromium, vanadium, molybdenum, tungsten, tin, cerium, or mixture thereof, in the form of a salt of an organic acid having up to about 8 carbon atoms

20. The composition according to claim 15 wherein the catalyst system comprises a source of catalyst metal selected from the group consisting of compounds represented by formula



- where M is one or more member of the group consisting of manganese, cobalt, nickel, chromium, vanadium, molybdenum, tungsten, tin and cerium, R and R' are the same or different members of the group consisting of a hydrogen atom and methyl, alkyl, aryl, alkenyl and alkynyl groups having up to about 20 carbon atoms, and n is 2 or 3.

21. The composition according to claim 15 wherein the catalyst system comprises a source of catalyst metal selected from the group consisting of compounds represented by formula



- where R and R' are the same or different members of the group consisting of a hydrogen atom and methyl, alkyl, aryl, alkenyl and alkynyl groups having up to about 20 carbon atoms.

22. The composition according to claim 15 further comprising an effective amount of one or more fuel additives which enhance desired fuel properties.

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